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(54) Title of invention: Nonaqueous eye makeup

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SPECIFICATION

1. Title of invention
   Nonaqueous eye makeup
2. Claims
   1) Nonaqueous eye makeup that contains as mandatory ingredients solid oil, volatile oil, pigment, and high-viscosity silicone oil.
   2) Nonaqueous eye makeup as described in claim 1 in which the high-viscosity silicone oil is dimethyl polysiloxane having a viscosity of 100,000cs - 1,000,000 cs.
3. Detailed Description of the Invention

This invention concerns eye makeup that has superior water resistance and oil resistance and is also excellent in time stability and usability; in particular, its purpose is an improvement in eye makeup of the nonaqueous type, such as eyeliner, mascara, etc.

Eye makeup such as eyeliner and mascara has heretofore been broadly classified by its form into emulsification type, coating-forming type, and nonaqueous type. Recently the range of use of makeup has expanded, and it has become commonplace to use makeup on occasions where formerly makeup was not used much, such as during sports or at the sea in the summertime. These commercial product lines, known as sports makeup or summer makeup, must be more resistant to water and sweat (as well as sebum) than previous products, and solving this problem has been a challenge for technicians.

Of the three types -- emulsification, coating-forming, and nonaqueous -- the nonaqueous type, being best in water resistance, has been the main type used in these commercial product lines, but it has still had many problems. Namely, consisting as it does of solid oils for the purpose of coating formation and volatile oils and pigments to enhance dryability as main ingredients, the nonaqueous type, although presenting no problems with water resistance, has had the drawback of being very poorly oil-resistant, being prone to sebum-caused makeup breakdown, and having poor adhesion onto the skin. In addition, due to its combination of various solid waxes, the nonaqueous type forms a wax gel structure that serves to hold the pigment and prevent its precipitation, which makes its temperature viscosity properties not very good; for example, at low temperatures in the winter its viscosity is too high, greatly worsening its usability, while at high

temperatures in the summer its lowered viscosity causes separation, and this has been a fatal defect in commercial products.

Thus attempts have been made to add semi-solid oils or liquid oils to the aforesaid main ingredients to improve adhesion onto the skin and improve the temperature viscosity properties, but in this case the semi-solid and liquid oils have even greater compatibility with the sebum than solid oils do, which has resulted in products that are even more prone to makeup breakdown and have poorer makeup retention.

In view of these problems, the inventor of this invention, after much diligent research to come up with eye makeup that has superior oil resistance and usability while fully exploiting the advantage of the oil type's superior water resistance, has arrived at the completion of this invention having discovered that said problems can be solved when one also uses specified high-viscosity silicone oils as mandatory ingredients, that is, that as a result of the superior temperature viscosity properties gained by adding high-viscosity silicone oil, one can guarantee stability and improve oil resistance by taking advantage of the property that it is not compatible with oil or sebum.

This invention concerns nonaqueous eye makeup that contains as mandatory ingredients solid oil, volatile oil, pigment, and high-viscosity silicone oil.

The mandatory ingredients to be used in this invention are described in detail in the following.

First, as solid oils, there are solid oil components that are normally used in eye makeup, such as, for example, solid waxes such as carnauba wax, candelilla wax, Japan wax, and beeswax; solid hydrocarbons such as ceresin, solid paraffin wax, polyethylene wax, and microcrystalline wax; solid higher fatty acids such as palmitic acid, stearic acid, and behenic acid; and solid higher alcohols such as cetanol and stearyl alcohol.

As the volatile oil components used to increase dryability one can list, for example, low-boiling-point isoparaffin hydrocarbons or low-boiling-point silicone oil and low-boiling-point cyclic silicone oil.

There are no particular restrictions concerning pigment; listed as examples are inorganic pigments such as iron oxide and chromium oxide, organic pigments such as legally prescribed talc, and extender pigment such as sericite, talc, kaolin, and titanium oxide, which are usually used in cosmetics.

Next, what suffices as the high-viscosity silicone oil is any silicone oil whose viscosity range is from 100,000 cs to 1,000,000 cs, with a range from 300,000 cs to 1,000,000 cs being particularly desirable; for example, one can cite dimethyl polysiloxane, methyl phenyl polysiloxane, and various modified polysiloxanes, but the best from the standpoint of safety and non-affinity with sebum is dimethyl polysiloxane. Here, if the viscosity of the silicone oil is lower than 100,000 cs, the viscosity-increasing effect with respect to the formulation will be weak, it will be easily affected by temperature changes, and the viscosity properties will be unstable. Conversely, the use of a silicone oil [whose viscosity is] higher than 1,000,000 cs is undesirable because, although it will provide superior stabilization of the viscosity of the formulation, its use feel will be bad and its adhesion onto the skin will be reduced.

The blended-in quantity of solid oils applied to this invention is in a range of 2-40 wt%, and preferably 5-20 wt%, with respect to the total weight of the cosmetic. With a quantity less than 2 wt%, one will not have enough network-structure viscosity to hold the pigment for a prolonged time, and pigment precipitation or separation will readily occur, while if the quantity exceeds 40 wt%, although there will be no problem with pigment precipitation or separation, the viscosity will be too high, making it difficult to expect pleasant coating-on when the cosmetic is used.

The quantity of volatile oil to blend in is in a range of 25-70 wt%, and preferably 30-60 wt%, with respect to the total weight of the cosmetic. With a quantity less than 25 wt%, the drying after it is coated on will be slow, and its usability will be inferior, while with a quantity greater than 70 wt%, not only will the viscosity of the formulation be low and its stability worse, but ill effects will occur during use, such as eyeliner smudging or mascara adhering to the eyelashes in beadlike form.

Next, the quantity of pigment to blend in is determined by such factors as the quantities of other components blended in and the concealing power required as eye makeup, but normally it is selected in a range of 10-40 wt%, and preferably 15-30 wt%, with respect to the total weight of the cosmetic.

Finally, the quantity of high-viscosity silicone oil to blend in is in a range of 5-50 wt%, and preferably 10-40 wt%, with respect to the total weight of the cosmetic. At a quantity of less than 5 wt%, sufficient enhancement of the viscosity

will not be obtained, and stabilization of the formulation cannot be expected, while at a quantity of more than 50 wt%, the viscosity will be too high, and the use feel will worsen.

Above, a nonaqueous eye makeup that is the purpose of this invention is obtained by selecting and appropriately combining the aforesaid solid oil, volatile oil, pigment, and high-viscosity silicone oil, but in this invention, in addition to said mandatory ingredients, one may use, in a range that does not depart from the purpose of this invention, ingredients that are normally used in eye makeup, such as semi-solid or liquid oils, pearl pigment preparations, pigment dispersants, resin components, plasticizers, fibers, scents, and preservatives. In order to minimize makeup breakdown caused by compatibility with sebum, the quantity to blend into the above other additives, especially for liquid oil components, should be kept to no more than 3 wt% with respect to the total weight of the solid oil.

The nonaqueous eye makeup of this invention, which consists of the above composition, is best suited in particular for eye makeup, especially eye makeup for summertime use, that has effects including water resistance and coating formability due to the solid oil that is a mandatory ingredient, dryability due to the volatile oil, and temperature stability, oil resistance, and usability due to the high-viscosity silicone oil.

To add another comment, the high-viscosity silicone oil used in this invention is what has previously been used for mold release agents, antifoaming agents, and fiber treatment agents, etc., so the effects of this invention can decidedly not be achieved even if one applies to this invention the silicone oil (less than 10,000 cs, even with the high-viscosity kind) that has heretofore been blended in cosmetics, and which has never been used in cosmetics intentionally for purposes such as those of this invention.

Next, in order to evaluate the nonaqueous eye makeup obtained with this invention, comparison tests were carried out for five evaluation items -- water resistance, oil resistance, coating strength, stability, and usability -- using the eyeliner of this invention obtained in below-described working example 1 and, for comparison, the conventional eyeliner given in below-described comparison example 1, as well as the mascara of this invention obtained in below-described working example 2 and, for comparison, the conventional mascara given in below-described comparison example 2. The results are presented in Table 1.

(1) Water resistance test

Samples of each of the above eyeliners and mascaras were coated onto a resin board using a nylon brush. Then, after air-drying them for 1 hour at room temperature, they were immersed for 10 minutes in flowing water, and they were checked for any loss of color, smudging, peeling, etc. There were 10 samples of each kind. The evaluations are denoted by a circle for no change, a triangle for partial loss of color or peeling, and an X for complete loss of color or peeling.

(2) Oil resistance test

Each test board prepared in the same way as for the above water resistance test was immersed for 10 minutes in a squalane circulating flow tank, and an evaluation was made by the same evaluation standards as for the above test.

(3) Coating strength test

Test boards on which the water resistance test or oil resistance test had been completed were rubbed repeatedly, using a friction testing machine, with water- or squalane-containing sponge chips, and they were checked for any falloff or peeling. The evaluations are denoted by a circle for no change, a triangle for partial peeling or falloff, and an X for complete peeling or falloff.

(4) Stability test

Glass test bottles were filled with samples of eyeliner and mascara, they were left standing under aging conditions of a constant temperature of -10°C, 20°C, 40°C, and aging conditions in a 48-hour cycle of -5°C to 40°C, and they were checked for any separation, coagulation, and change of viscosity. The evaluations are denoted by a circle for no change, a triangle for some separation, coagulation, or change in viscosity, and an X for significant separation, coagulation, or change in viscosity.

(5) Usability test

Eyeliner containers and mascara containers were filled with respective samples, the usual use tests (10 persons for each sample) were carried out for one month by 40 women panelists, and an overall evaluation was made for ease of application, smudging, etc. The evaluations are noted by a circle for good, a triangle for generally good, and an X for bad.

Table 1: Comparison evaluation tests

Item	Sample	Eyeliner		Mascara	
		Working example 1	Comparison example 1	Working example 2	Comparison example 2
Water resistance		o	o	o	△
Oil resistance		o	△	o	△
Coating strength	Water resistance	o	o	o	△
	Oil resistance	o	x	o	x
Stability	-10°C	o	o	o	△ (gelling)
	20°C	o	o	o	o
	40°C	o	x (separation)	o	x (separation)
	Aging	o	x (separation or gelling)	o	x (separation or gelling)
Usability		o	△ (high viscosity)	o	o

The working examples and comparison examples are presented as follows. The blend proportions are in parts by weight.

Working example 1: Eyeliner

A:

Microcrystalline wax	7.0
Carnauba wax	0.5
Beeswax	2.0
High-viscosity silicone oil (1,000,000 cs)	13.0

B:

Black iron oxide	15.0
Titanium oxide	8.0

C:

Low-boiling-point isoparaffin	54.5

(Method)

Mix one part each of B and C, disperse with three rolls, and make into a paste. Heat A and the remainder of C to 80-90°C and stir to make them uniform. To this add the above paste, and cool while stirring at high speed.

Comparison example 1: Eyeliner

A:

Microcrystalline wax	4.0
Cholesterol	2.0
Beeswax	4.5
Stearic acid	1.0
Carnauba wax	0.5
Japan wax	1.0
Sorbitan monostearate	1.0

B:

Black iron oxide	21.0

C:

Volatile isoparaffin	65.0

(Method)

Manufactured by the same method as working example 1.

Working example 2: Mascara

A:

Microcrystalline wax	0.5
Polyethylene wax	5.0
Carnauba wax	10.0
Candelilla wax	2.0
Beeswax	1.0
High-viscosity silicone oil (500,000 cs)	10.0

B:

Black iron oxide	13.0

C:

Aluminum stearate	3.5

D:

Low-boiling-point silicone oil	5.0
Low-boiling-point isoparaffin	50.0

(Method)

Mix one part each of B and D, disperse with three rolls, and make into a paste. Heat A and the remainder of D to 80-90°C and stir to make them uniform. To this add the above paste, and add C at 80°C or less while stirring at high speed. Raise to 90°C with weak stirring, then cool.

Comparison example 2: Mascara

A:

Microcrystalline wax	10.0
Candelilla wax	5.5
Carnauba wax	12.0
Isostearic acid	2.5

B:

Talc	2.0
Black iron oxide	12.0

C:

Volatile isoparaffin	56.0

(Method)

Manufactured by the same method as working example 1.

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